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UNION STATION, WASHINGTON, D. C.

STATEMENTS

BEFORE THE

COMMITTEE ON THE DISTRICT OF COLUMBIA,

UNITED STATES SENATE,

FRIDAY, JANUARY 18, 1907,

ON THE

BILL (H. R. 9329)

TO AMEND AN ACT APPROVED FEBRUARY 28, 1903, ENTITLED "AN ACT TO PROVIDE FOR A UNION STATION IN THE DISTRICT OF COLUMBIA, AND FOR OTHER PURPOSES."

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GOVERNMENT PRINTING OFFICE.
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UNION STATION, WASHINGTON, D. C.

FRIDAY, *January 18, 1907.*

The committee met at 10.30 a. m.

Present: Senators Gallinger (chairman), Hansbrough, Dillingham, Scott, Allee, Burkett, Gearin, Blackburn, and Whyte.

Henry B. F. Macfarland, president of the Board of Commissioners of the District of Columbia; Henry L. West, Commissioner of the District of Columbia; S. C. Neale, attorney; Samuel Rea, third vice-president; John Cassels, of the board of directors; Joseph Crawford, general agent; A. W. Gibbs, general superintendent of motive power, and A. C. Shand, chief engineer, representing the Pennsylvania Railroad Company; George E. Hamilton, attorney; Hugh L. Bond, jr., second vice-president and general attorney; G. L. Potter, third vice-president; D. D. Caruthers, chief engineer, representing the Baltimore and Ohio Railroad Company; R. P. Andrews, Conrad H. Syme, and Col. O. G. Staples, representing the Business Men's Association of the District of Columbia; Evan H. Tucker, president of the Northeast Washington Citizens' Association; William A. Donch, an attorney residing in northeast Washington, and others, appeared.

OPENING STATEMENT BY THE CHAIRMAN.

The CHAIRMAN (Senator Gallinger). This meeting has been called for the purpose of giving consideration to the bill (H. R. 9329) to amend an act approved February 28, 1903, entitled "An act to provide for a union station in the District of Columbia, and for other purposes." The bill reads as follows:

"*Be it enacted, etc.*, That to provide adequate facilities for handling mail, baggage, express, and other business or matter carried on passenger trains, the Washington Terminal Company be, and it is hereby, authorized to locate, construct, maintain, and operate tracks, switches, sheds, and other structures and facilities in and upon the parts of squares numbered seven hundred and nineteen and seven hundred and twenty, lying and being between the eastern line of the terminal area, as described in said Union Station act of February twenty-eighth, nineteen hundred and three, and the western building line of Second street east; and the said terminal company is hereby authorized to acquire, by purchase or condemnation, as provided in said Union Station act of February twenty-eighth, nineteen hundred and three, the lands and property in said squares as above mentioned; and to accomplish the purposes of this act, in addition to the streets vacated, abandoned, and closed by the provisions of the said Union

Station act of February twenty-eighth, nineteen hundred and three, and the acts therein referred to, and in accordance with the provisions thereof, the following-named streets and alleys, to wit: Chicago street and G street and all public alleys in said squares shall be vacated, abandoned, and closed from the said eastern line of the said terminal area to the western building line of said Second street east: *Provided*, That said terminal company be authorized to acquire, by purchase or condemnation, as provided above, all the lands and property in square seven hundred and twenty-one lying between the eastern line of the aforesaid terminal area and the western building line of Second street east and between F street and the east-and-west public alley between F street and California street: *And provided further*, That the said terminal company shall dedicate to the District of Columbia sufficient land for a street sixty feet wide on the east side of said terminal area from F street to California street: *And provided further*, That, except as modified by this act, all provisions of the aforesaid Union Station act of February twenty-eighth, nineteen hundred and three, and of the acts therein referred to, shall apply to the structures and tracks authorized herein.

"SEC. 2. That on and after January first, nineteen hundred and eight, the provisions of the act of Congress approved February second, eighteen hundred and ninety-nine, entitled 'An act for the prevention of smoke in the District of Columbia, and for other purposes,' shall be, and are hereby, extended to apply to any and all steam locomotive engines of any description used on any steam railroad within the District of Columbia; and any officer, agent, or employee of any individual, firm, or corporation operating any steam locomotive engine or any steam railroad within the District of Columbia from the smokestack of which engine shall issue or be emitted dense or thick black or grey smoke or cinders after the date above mentioned shall be deemed and held guilty of creating a public nuisance and violating the provisions of said act.

"SEC. 3. That Congress may at any time amend or repeal this act."

The CHAIRMAN (continuing). As I understand the matter, there is no objection—certainly none has reached this committee—to section 1 of the bill; but there is a controversy concerning section 2. The Commissioners of the District of Columbia have urged the passage of this or some similar provision, while the railroad corporations have suggested to the chairman of the committee that there would be grave difficulties in the way of conforming to that section if it should become a law.

Some time ago, in anticipation of this hearing, I addressed letters to the Pennsylvania Railroad Company, to the New York Central and Hudson River Railroad Company, and the New York, New Haven and Hartford Railroad Company, making certain inquiries of the presidents of those roads as to what their several roads had done in the direction of the electrification of their lines looking to the feasibility of the proposed legislation.

Under date of April 11, 1906, the president of the New York Central and Hudson River Railroad Company, Mr. W. H. Newman, replied as follows:

NEW YORK CENTRAL AND
HUDSON RIVER RAILROAD COMPANY,
GRAND CENTRAL STATION,
New York, April 11, 1906.

Hon. JACOB H. GALLINGER,
United States Senate, Washington, D. C.

DEAR SIR: I have your letter under date 10th. This company is actively engaged in the necessary work for substitution of electric for steam operation of its line in the vicinity of the terminal station in New York City.

While the proposed change will remove all complaints of smoke nuisance, it was determined upon not on that account, but to conform to the statute which prohibits, after a fixed date, the use of steam power in the tunnel.

Very respectfully, yours, W. H. NEWMAN.

The president of the New York, New Haven and Hartford Railroad Company, under date of May 15, 1906, made this reply:

THE NEW YORK, NEW HAVEN AND
HARTFORD RAILROAD COMPANY,
New Haven, Conn., May 15, 1906.

Hon. J. H. GALLINGER,
United States Senate Chamber, Washington, D. C.

DEAR SIR: Your favor of the 10th, I very much regret to say, has been mislaid, and has not received the attention it should.

The work we are doing to electrify our line between Stamford and New York was required by an act of the city of New York eliminating steam as a method of traction south of the Harlem River, and to substitute electricity for so short a distance would have required an expenditure wholly out of proportion to the results attained.

Therefore our company concluded to electrify its line as far east as Stamford, and the New York Central Company to points a considerable distance out, I think White Plains, on the Harlem division, and Croton on the Hudson River division.

The work was not voluntary on the part of our company, but was purely because of the requirements of New York law, and the further fact that it was an economical method, if we were required to use electricity for traction at all, that it be used for a sufficient distance to give the operating results we were after.

Of course we avoid the trouble from the smoke nuisance in this way, and I have no doubt that had an influence upon the legislation which was passed prohibiting the use of steam south of the Harlem River, but I believe the main object hoped to be accomplished was the increased safety from the elimination of steam and smoke in the tunnel, thus obscuring the signals which govern the movement of trains. You will recall there have been several serious accidents within the past few years largely attributable to this cause.

Yours, truly,

C. S. MELLEN, *President.*

The late Mr. Cassatt, president of the Pennsylvania Railroad Company, replied under date of April 4, 1906, as follows:

THE PENNSYLVANIA RAILROAD COMPANY,
OFFICE OF THE PRESIDENT,
Philadelphia, April 4, 1906.

DEAR SIR: House bill No. 9329, authorizing the Washington Terminal Company to acquire additional ground adjacent to its station, contains in section 2 what practically amounts to a prohibition of the use of bituminous coal in locomotives operating within the District. In reference to this section permit me to say:

First. It is not, in my opinion, practicable to give up the use of bituminous coal in locomotives operating within the District.

Second. The tracks in the terminal station and in the approaches, both from the north and from the south, will be used solely for passenger trains, so that there will be a minimum amount of smoke emitted from the locomotives engaged in this service. The old line through the city, over which freight trains will be moved, is so far removed from all public buildings and buildings of any importance that they can not be injuriously affected.

Third. As Congress can at any time deal with this matter, it seems that it ought to wait until experience shows whether such legislation as that proposed is necessary to protect the interests of the District.

Yours, very truly,

A. J. CASSATT, *President.*

Hon. J. H. GALLINGER,
Chairman Committee on District of Columbia,
United States Senate, Washington, D. C.

Attached to this letter, probably by the clerk of this committee, there is a newspaper item headed "Pennsylvania equips locomotives with smoke consumers," which reads as follows:

"PITTSBURG, *October 16.*

"The Pennsylvania Railroad to-day announced that it had equipped 30 locomotives with steam-jet smoke consumers, and that if results proved as satisfactory as is hoped all locomotives of the entire system would be so equipped."

I have here a clipping from a newspaper, I do not know what paper it is from, headed: "Electricity to take the place of steam on the New York Central from the metropolis to Albany." It is an interesting contribution to the subject, and I will make it a part of this hearing.

The matter referred to is as follows:

ELECTRICITY TO TAKE THE PLACE OF STEAM ON THE NEW YORK CENTRAL FROM THE METROPOLIS TO ALBANY.

"Will the electric railway motor supplant the steam locomotive? This is a question which, within the last few years, has been frequently asked, but has so far been answered only by conjecture. However, there are now sufficient facts at hand to demonstrate that the battle which has been waged between electricity and steam is about to come to a climax. Preparations are on foot that will bring

the opposing forces together for a decisive struggle within the next few months, and those who have studied the situation predict a victory for electricity.

"When the electric motor pulled the first street car successfully through the streets of Richmond, Va., in 1888, many enthusiasts on the subject of electric railway propulsion hailed this event as the death knell of the steam locomotive. Of course, we all know that these prophecies were somewhat premature. Nevertheless, the electric railway has steadily advanced in development, and its progress into the domain of the steam locomotive has been steady and sure.

"From propelling, originally, the street car in the larger cities, it became afterwards the motive force of the suburban line, then of the interurban line, and of late there have been many electric roads built parallel to the steam lines, until now the electric road in many cases is a competitor of the steam road and a dangerous one at that. While the street-car motor when it was first introduced had a capacity of 15 horsepower only, it is now being built up to 400 and 500 horsepower.

"Railroad companies are notoriously conservative in their business methods, and it is well for the stockholders that they are so. They looked for a long time upon the pretensions of the electric motor with scorn and derision, partly because they were so thoroughly acquainted with the steam locomotive and its possibilities, and partly because they realized that the adoption of a new propelling system for their trains would have consequences that meant a revolution of the entire railroad ramifications. But in spite of this, the electrical experts kept on improving the electric railway motor, and every year since 1888 has witnessed new developments and new triumphs for electricity.

"As every new electrical triumph meant another encroachment upon the steam locomotive, these advances became so persistent that at last the railroad companies were forced to take notice in self-defense. The number of electric roads grew enormously, and wherever they appeared in competition with the steam roads as handlers of local or suburban freight the steam road was driven to the woods. What has been the result? Practically every trunk-line railroad company has already begun the installation of electricity on its lines, or is making preparations to take this step in the immediate future.

"The New York Central Railroad is equipping its main line with an electric system to run trains from the Grand Central Depot in New York City up into the State of New York as far as Albany. At a recent meeting of the directors it was decided to issue $150,000,000 additional stock to be used in extending their lines in New York by electric roads.

"The Pennsylvania Railroad has for some time operated electric trains on its Long Island division, and this work is now being constantly extended. The same company recently made another contract for the electrical equipment of its line from Philadelphia to Atlantic City.

"These lines, as is well known, have heretofore been operated by some of the finest trains that ever ran on this continent, and at a speed not exceeded anywhere. In the face of this the company is now engaged in the abandonment of the steam system and is substituting electricity. And when a railroad company like the Pennsyl-

vania takes a step so radical it is a foregone conclusion that it has made investigations, the results of which make this new departure a necessity from the best business considerations.

"The New York, New Haven and Hartford recently contracted for 30 electric locomotives with the Westinghouse Company, of Pittsburg, to be installed on its line between New York City and Stamford, Conn. The New England company has already begun to equip some of its main tracks electrically. The power house, where the electric current is to be generated, is well under way, and before long electric express trains will run on a regular daily schedule.

"The Erie Railroad is the next road which will introduce electricity on part of its main line, and once the start has been made there the Gould roads will naturally fall into line.

"The Grand Trunk line recently contracted for electric power to operate its lines under the St. Clair River between Detroit and Windsor, because it had demonstrated to its own satisfaction that electricity would be cheaper than steam.

"The Illinois Central Railroad is making similar preparations for the introduction of electricity; indeed, there is not a steam railroad man in the country who would have pooh-poohed the idea five years ago that will not tell you now that the electric railway era has dawned and that the electric locomotive is the coming propelling agent for railroad trains.

"As to the advantages of the electric railway over steam, they are so generally recognized that they scarcely need mentioning. If this were not the case, their introduction would not appeal to the railroad companies. But there can not be any question that the traveling public will also derive benefits from the change. The operation of electric trains being cheaper, there will be many more trains and thus increased accommodations. The electric locomotive will be cleaner. There will be no smoke, no dirt, no cinders; neither will it be so noisy.

"Apart from the wonderful effects which this change will produce upon the future method of railroad transportation, the immediate results are worthy of consideration. There are the large amounts of money that will be spent to effect this change. At a conservative estimate, there are now about $500,000,000 appropriated by the various railroad companies throughout this country to be used in the purchase of electrical machinery. This, of course, means an activity in the electrical business not equaled by any period in the history of that industry, and it will again emphasize a fact which has long been patent to the men at the head of the electrical manufacturing companies, and that is that the electrical industry of America leads the world."

The CHAIRMAN (continuing). I think it is proper, gentlemen, that the proponents of this measure should be first heard, and I will ask Mr. Macfarland, president of the Board of Commissioners of the District of Columbia, to open the discussion, if it pleases him to do so.

STATEMENT OF HENRY B. F. MACFARLAND, PRESIDENT OF THE BOARD OF COMMISSIONERS OF THE DISTRICT OF COLUMBIA.

Commissioner MACFARLAND. Mr. Chairman, the Commissioners and the community are heartily in favor of the provision in section 2 of the bill as passed by the House, and trust that it may be passed by your committee and by the Senate.

As you know, the smoke law, approved February 2, 1899, applies only to stationary engines, and the Commissioners have repeatedly recommended that it should be applied to locomotive engines. Until this is done the present smoke nuisance, chiefly due to the railroad locomotives, must continue, to the detriment of the capital and the great discomfort of its citizens and visitors.

The Commissioners had hoped that the railroads which are to use the Union Station would respond favorably to a request which the Commissioners made in November last, that after the completion of the Union Station and terminal they would use nothing but electric motors as the only perfect means of ending the smoke nuisance. It can be ended in a measure by the use of anthracite coal; it can be ended in a measure by the use of smoke consumers; but the only perfect way to end it is by the electrification of these railroads within the District of Columbia and its vicinity. But their responses were so unfavorable that the Commissioners were constrained to recommend to Congress that the railroads be brought under the "smoke law" in order to compel them to do away with the smoke-emitting locomotives.

Upon inquiry I learned that at this time the approximate number of locomotives in daily use in the District of Columbia is at least 205. This is the number used by the Philadelphia, Washington and Baltimore (that is, the Pennsylvania), the Baltimore and Ohio, the Chesapeake and Ohio, the Washington-Southern, and the Southern.

Anyone can see any day, any hour of the day, the volume of dense smoke which these locomotives constantly pour over the city. Everyone can see the effect upon the Capitol building, upon other public and private buildings, and upon the parks and the streets. The Union Station itself, which will be the finest in the country, is endangered by the smoke and gases of the steam locomotives.

Moreover, our own citizens, who have spent so much time and money in improving their plants so as to bring about a compliance with the "smoke law," now so general among those affected by it, have a right to complain of the injustice done them by permitting the railroads to go scot-free.

Since the "smoke law" was sustained by the highest court, after the prolonged litigation which followed its enactment, fines and collaterals forfeited for violations of it have, up to last Saturday, amounted to over $12,000 ($12,210), and probably ten times as much has been expended in rearranging and equipping the plants to meet the law's requirements.

The effort of the District government to enforce the law and of the persons affected to comply with it have been largely successful, but the purpose, the abolition of the smoke nuisance, has been defeated by the railroad locomotives, which have all along made the greater part of the nuisance. Running as they do south of Pennsylvania avenue as far west as Fourteenth street, they contribute that cloud of smoke which constantly rests over the south part of the city and over Pennsylvania avenue from Capitol to White House, as well as a very serious amount of smoke in the northeast section of the city, due to the lines entering there.

As the Commissioners suggested to the railroads in November, the best way to end the nuisance is to substitute electric motors. The railroads plead in reply that this was impracticable at the present

time, but they gave no intimation of the time when it would be practicable. If it were true that it was absolutely impracticable, nothing more could be said on that point, although the argument for the second section of the bill before you would be just as strong, since its requirement might be met by the use of anthracite coal or by smoke consumers.

But the railroads themselves have demonstrated that the electrification of railroads is entirely practicable. It has passed the experimental stage. They have shown that it is economical and efficient. In New York City and vicinity the New York Central and the New York, New Haven and Hartford have already done what we ask of the railroads for the District of Columbia; and the Pennsylvania Railroad, which has so large a part in all the railroad traffic here, is about to follow their example in its terminal work at New York. The Pennsylvania Railroad is also at present operating an electric railroad across the State of New Jersey, from Camden to Atlantic City, a standard railroad. The Baltimore and Ohio Railroad has for ten years successfully carried its freight trains through Baltimore by electric motors. What man has done man can do.

The electrification of the railroads within the District of Columbia, beginning possibly at Baltimore, Washington Junction, and Alexandria on the different approaches to the city, would not only eliminate the smoke and gases, flame and steam, which of themselves make accidents worse and sometimes help to bring them about, but would greatly tend to prevent accidents. If, for example, the Baltimore and Ohio, Metropolitan Branch, had been electrified even from Rockville to Washington with the necessary and inevitable electrical block connections, the terrible Terra Cotta disaster, more fatal than many a battle, could not have occurred.

William Maver, jr., member of the American Institute of Electrical Engineers, in a comprehensive article entitled "Electrification—a Railroad Revolution," in the December Review of Reviews, says:

"The safety of the traveling public can be better safeguarded by electric traction than by any other known means of railway locomotion. Thus it would be quite practicable to so arrange the blocks of an electric railway that as a train passed from one block into the next it would cut off the power in the block behind, so that collisions would be next to impossible. It would also be practicable, by suitably arranging the power circuits of an electric railway for the operator at a tower station to cut off the power from any block into which a heedless motorman might have entered in the face of warning signals."

That precisely covers the case of the Terra Cotta disaster.

As Mr. Maver's article gives the latest information as to what has been done in England, where much has been accomplished, and in this country, with respect to the electrification of railroads, I have provided a copy for each member of the committee and trust that you may find time to read it.

Through the courtesy of Mr. W. C. Dodge, of this city, I am able to present also, for the record, abstracts of all the similar publications on the subject contained in the Washington Public Library since 1902, including articles by railroad men and electrical engineers. In these articles and those cited by Mr. Maver practical men tell

what has been done and what has been planned practically and is about to be done by the railroads. They are not speculations by theorists. Take, for example, the description by W. J. Wilgus, vice-president of the New York Central and Hudson River Railroad, of the electrification of the New York zone of his railroad, in the Electrical Review, September 8, 1906, or his more general article in Harper's Weekly, September 3, 1904, which begins thus:

"The electrification of the passenger traffic of two of the most important railroads in the world for distances from 25 to 35 miles, radiating from a terminus in the greatest city on the western hemisphere, may well be said to mark the beginning of a new epoch in the history of transportation."

The practical success of the railroad electrification in and near New York City is the best evidence that equal success in such an undertaking is assured in advance in and near the District of Columbia. Our terminal presents no such difficulties as that, for example, at the Grand Central Station in New York City, with its complex system of tracks and switches handling over 800 train movements a day.

Sooner or later this change will be made here. I want it sooner rather than later. It is merely a question of how soon the railroads will spend the money necessary to make the change. It is regrettable that they did not voluntarily undertake it in the interest of the traveling public, of their own Union Station, and, above all, of the national capital.

The CHAIRMAN. Mr. Macfarland, pardon me for interrupting you. In your investigations have you formed an idea as to what the approximate cost would be to the roads entering Washington if they came into the Union Station under electric power?

Commissioner MACFARLAND. I have not. I have not the means to do that, Mr. Chairman. No one appreciates more than I their cooperation with Congress and the Commissioners, and especially what was done by the late great president of the Pennsylvania Railroad, in all the efforts to make the terminal improvement here minister not only to convenience and safety but to beauty, so as to give us a noble gateway on our great east and west boulevard, while freeing the Mall from the servitude of railroad tracks and the station. But no one regrets more that this participation of the railroads in the greatest municipal improvement we have secured was not crowned by the voluntary elimination of smoke-emitting locomotives.

I ask leave, Mr. Chairman, to append these abstracts and extracts on the subject of the electrification of railroads from different technical and other publications.

The CHAIRMAN. Very well; hand them to the stenographer.

The matter referred to is as follows:

[Engineering Magazine, 1902, vol. 22, p. 756.]

In its review of the British press, it quotes Mr. W. E. Langdon's address before the Institution of Electrical Engineers on the adoption of electricity as the motive power for railroads. He says that "electricity is credited with the power of accomplishing greater speed at less cost than steam" and that "greater facilities for rapid transit

between large centers of commerce are a necessity of the day, and if it should transpire that electrical propulsion is inapplicable to main-line traffic as a whole it will unquestionably lead to the establishment between chief commercial centers of high-speed passenger or electric traction or independent lines. Communication between Manchester and Liverpool has so far been met—and one would say amply so—by three lines of railway, all running a good train service. Yet the construction of an electric line on the monorail system has received Parliamentary sanction." He then discusses the effect of such a change on existing interests, and says:

"Are existing industries and investments to act as a bar to the development of new methods simply because of the upheaval which the change would cause? The advent of steam destroyed the stage-coach business, and small as this was compared with the present railway interests the principle involved is the same. Because an industry has remained undisturbed in the possession of a certain field for many years does it thereby acquire a monopoly which is to bar all progress in rival methods of a new and revolutionary nature?"

So in this case, because the railroads have for a long time used steam and created this intolerable smoke nuisance, greatly to the injury of the health and property of the general public, are they to be permitted to continue it, when, as shown, the adoption of electric motive power will furnish a complete remedy, and at less cost?

[Current Literature, 1903, vol. 34, p. 677. By C. L. De Muralt.]

Gives the cost in detail of electricity for motive power as compared with steam on the Pennsylvania and the New York Central railroads, and shows there would be a saving of over $4,762,000 on the former and over $3,938,000 on the latter. This is said to be a "conservative estimate," and that "it would be almost double the amount necessary to pay a handsome return on the additional investment," and would, of course, eliminate entirely the nuisances of smoke, cinders, and the suffocating gases in tunnels.

[North American Review of 1903, vol. 176, p. 719.]

Mr. Muralt discusses at some length Mr. Vanderbilt's article in a previous number of the North American Review, and repeats his statement as to the saving on the Pennsylvania and New York Central roads by the substitution of electricity for steam as a motive power for the roads, and adds that where water power is available, as at Niagara, the upper Hudson, and St. Lawrence, the cost would be reduced to the extent of one-third of the cost for fuel. He concludes his article as follows (Muralt, in the Review of Reviews, December number, 1906):

"Hardly anybody doubts that the public would greatly appreciate the advantages inherent in electric traction, and the above figures go to show that the change would in the great majority of cases be accompanied also by an increased net revenue for the railroad company."

[Atlantic Monthly, 1904, vol. 93, pp. 730 to 736.]

Contains an interesting article by Ray Morris, comparing the success of the trolley roads with the steam roads for 34 miles, between Cleveland and Oberlin, Ohio.

In seven years, from 1895 to 1902, the passenger traffic on the steam roads was reduced from 203,014 in 1895 to 91,761 in 1902.

Between Cleveland and Painesville the number of passengers on the steam roads was reduced from 199,292 in 1895 to 28,708 in 1902, and between Cleveland and Lorain the number was reduced from 42,456 in 1895 to 9,705 in 1902.

So, too, between Detroit and Ann Arbor, Mich., before the electric road was built, the daily traffic was about 200 passengers per day, and the first year after the trolley road was opened it increased to 4,000 per day.

[North American Review, 1902, vol. 175, p. 779.]

ELECTRICITY AS A MOTIVE POWER.

By CORNELIUS VANDERBILT.

After discussing the relative cost of steam and electricity at considerable length, he says:

"We know from experience that in this (passenger) class of service increased conveniences and facilities in many cases more than compensate for increased cost of transportation. This convenience, as we may term it for want of a better word, includes general convenience to passengers, speed, number and frequency of trains, and is the all-important point in passenger traffic. Combining this with the fact that after a certain density of traffic is realized the fuel cost may be reduced, we have the reason for the success of the trolley system and the adoption of electricity as motive power on certain metropolitan and suburban roads."

[Engineering Magazine, 1903–4, vol. 26, p. 280.]

Publishes articles from Electrical Review, showing the profitable result of the adoption of electric in lieu of steam power on the Manhattan Elevated Railroad.

"For the quarter ending June 30, 1903, and the corresponding quarter of the preceding year, the following facts will suffice to show the advantage of the change from steam to electricity. The gross earnings during the three months showed an increase of $400,000, while the expenses were reduced $99,000, there being thus shown a gain to the profit account of about half a million dollars. The cost of carrying a passenger in 1902 is given as 2.24 cents, while with the electric traction this had been reduced to 1.98 cents."

* * * * * * *

"The requirements of municipal cleanliness and safety will soon compel all steam railways to use electric traction for their entrance to terminal stations, and the service of electrical locomotives for such service will doubtless gradually extend out to near-by points and with constantly increasing distances as the advantages make themselves apparent."

[Scientific American Supplement of April 9, 1904.]

Describes the first run under actual working conditions of an electric train on a trunk railroad in Great Britain, where both the

electric and steam cars were in simultaneous operation upon the same track and without interfering one with the other. It says:

"The section of trunk road to be converted to electricity is that between Liverpool and Southport," nearly 24 miles.

"Under steam conditions there are 36 trains per day in either direction running, making an aggregate mileage of 1,900. The time occupied in the journey is twenty-five minutes by express train and fifty-four minutes by trains stopping at all intermediate stations. By electric traction it will be possible to accelerate the speed of the stopping trains to thirty-seven minutes, a saving of seventeen minutes upon the old system, owing to higher speed attainable between stations and less time occupied in slowing down and stopping as well as in restarting and attaining maximum speed again. Furthermore, owing to the more economical facilities of electrictiy, the number of trains will be increased to 65 in each direction, representing a total daily mileage of 3,200 instead of 1,900, without increased cost. The express (steam) trains will take twenty-five minutes as before.

"On the first trip the journey of 18 miles was accomplished in twenty-seven minutes, and would have been shorter had not the train been stopped by adverse signals. Forty-seven miles have been converted, the third-rail system being used."

[Harper's Weekly, December 3, 1904, pp. 1837 and 1851.]

A NEW EPOCH IN RAILROADING.

By W. J. WILGUS, vice-president of New York Central and Hudson River Railroad, illustrated by a view of the electric locomotive built for them.

"The electrification of the passenger traffic of two of the most important railroads in the world for distances from 25 to 35 miles radiating from a terminus in the greatest city on the Western Hemisphere may well be said to mark the beginning of a new epoch in the history of transportation.

"The time has arrived when the changed conditions in the great centers of population demand a different system of transportation on our trunk lines than has heretofore existed.

"The traveling public within what may be termed the suburban zones are no longer satisfied with trains of many cars hauled by heavy locomotives at lengthy intervals; neither do they tolerate with patience the smoke, gas, cinders, and noise of the steam locomotive. In other words, the steam railroad, if it is successfully to hold and multiply its suburban traffic, must offer the advantages to which the public has become educated by the marvelous development of electric railways within the past twenty years. The cultivation of suburban service, too often neglected and despised by steam railroads, in addition to its own pecuniary reward, has the even greater advantage that comes from the long-haul passenger and freight traffic of the growing community thus fostered by a popular local service.

"Having these objects in view, the New York Central and Hudson River Raidroad Company began in 1899 a careful study of the problem of changing the motive power in what has been termed the 'New York zone,' south of Croton, on the Hudson division, main line, and on the Harlem division south of White Plains. This study also necessarily included the handling in a similar manner of the through

and suburban service of the New York, New Haven and Hartford railroad south of the junction at Woodlawn.

"The natural conservatism of a large corporation like the New York Central and Hudson River Railroad Company, and the unprecedented magnitude and importance of the change, led to a more than ordinarily careful and deliberate consideration of the abandonment of the long and well tried steam locomotive for a comparatively new method which had not yet been employed for the peculiar character of service existing on two of the principal trunk lines of the country.

"The hauling of 800-ton trains laden with passengers, mail, and express, at speeds of 60 miles per hour, with regularity and safety, had not been attempted by electricity. The Grand Central Station, with its complex system of tracks and switches, and handling from 500 to 700 trains in twenty-four hours, presented a problem of unusual difficulty. As a result of this thorough investigation of the entire subject, the company finally in 1902 decided to proceed with the change of motive power, and in the following year the State and municipal authorities gave their sanction."

He goes on to say that the execution of the work was committed to a commission who set to work to decide on the details of the plan, and that its work was admirable, and that at that time (in 1904) the central power stations had been decided upon, and that two electric stations were then being constructed, one at Port Morris and the other at Yonkers.

To-day the system is in practical operation, the electric locomotive hauling the trains to Highbridge, a distance of 7 miles from the Grand Central Station, and will go farther as soon as the tracks can be completed.

The Review of Reviews of December, 1906, contains a complete description of the plan, covering 9 pages, with numerous illustrations of the locomotives, tracks, power houses, etc.—a most interesting article, by William Maver, jr., member of the American Institute of Electrical Engineers.

[The Scientific American Supplement of December 9, 1905.]

Contains a long article on "The electrification of the New York Central terminal lines." It contains illustrations of the Grand Central Station, power house at Yonkers, one of the electric locomotives, and on pages 25, 28, 29, and 30 additional illustrations or views of the elaborate system of tracks at and near the Grand Central Station, a map showing the 90 miles of track for electric cars, views of the suburban electric motors, together with many details and description of the entire scheme—a most interesting article covering many pages, too lengthy to copy. It further says:

"The New Haven road will operate both the motor cars for suburban traffic and electrical locomotives for the through trains between Stamford, Conn., and Woodlawn; whence the New Haven trains run into the Grand Central Station over the New York Central's tracks."

This article further states that "34 miles of the Erie Railroad is to be electrified on the Rochester division with power transmitted 70 miles from Niagara Falls."

[Scientific American of April 7, 1906, p. 290.]

ELECTRIC TRACTION ON THE SIMPLON RAILWAY.

By Dr. Alfred Gradenwitz.

This describes the electrification of the Simplon Tunnel railway, leading from France and Switzerland to Italy, and is illustrated by a view of one of the 1,000 horsepower electric locomotives used to haul the train through the tunnel, the trains to be transferred from steam to electric locomotives at opposite ends of the tunnel, which is 8 miles long with a 10 per cent grade.

Among the advantages of substituting electricity for steam, which has previously been used, was the freedom from smoke and gases in the terminal and its thorough ventilation.

It was to go into operation June 1, 1906, and as this article was published in the preceding April, it could not of course give the result.

[Scientific American, April 21, 1906, p. 322.]

It says: "The magnitude of the work involved in the equipment of the New York Central terminal and suburban lines looms so large before the public that the great work of electrically equipping the New Haven system is scarcely receiving the attention it deserves. This important four-track system is to be operated from the Grand Central Station (in New York) to Stamford (in Connecticut) entirely by electric locomotives, and the work of equipping the line and constructing the rolling stock is being rapidly pushed forward with a view to the earliest possible operation of the road."

It then goes on to describe briefly the locomotives, which are to be of the Westinghouse type, weighing 72 tons each, the current to be used, etc.

It gives the cost of the power house at $1,130,000—the 21 miles of four-track road at $575,000 and the locomotives required at $1,050,000—a total of $2,755,000. As the plan had not gone into operation at the time this article was published, it of course could not state the result, but it is a part of the New York Central plan and is based on the result of the lengthy and thorough investigation made for the latter, and shows beyond question their belief in its success, and which is confirmed by the fact, as shown by the daily press, that the plan is now in successful operation.

[Scientific American Supplement, September 22, 1906. A paper read before the New York Railroad Club by Mr. J. E. Muhlfeld, general superintendent of the motive power of the Baltimore and Ohio Railroad, entitled "Large Electric and Steam Locomotives."]

He says the Baltimore and Ohio has 6 electric locomotives in use, 4 of which have been in service for ten years and 2 others that went into service about September, 1903. Nos. 1, 2, and 3 have a weight of 196,000 pounds each. One is a small switching locomotive, while the two which went into use in 1903 are more powerful, hauling 70,000 pounds and having a starting power of 80,000, giving a nominal rating of 1,600 horsepower. On a level track, with good current and weather conditions, he says they are capable of starting and accelerating a train weighing 3,000 tons, and that on a 1 per cent grade they will start and accelerate a train weighing 1,400 tons. He

further says: "These locomotives handle east-bound through-freight steam locomotives and trains at Baltimore, Md., from Camden yard to Waverly, a distance of a little over 3.4 miles, returning light. This distance includes 7 curves, ranging from 5° to 11°; 7 tunnels from 400 to 7,000 feet in length, and gradients from 0.8 to 1.5.

"The time consumed when hauling freight trains weighing 1,395 tons in cars of various capacities and lading, 105 tons in steam locomotives, and 160 tons in electric locomotives, or a total moving load of 1,660 tons, averages twenty-three minutes actual running time from start until the electric helper locomotive cuts from the head end of the train to return light."

The electric locomotive slips in from a side track and hitches onto the steam locomotive, which latter then ceases to work, the electric locomotive hauling it and the train through, when it is disconnected, and running on ahead is run off on a side track, while the steam locomotive resumes operation and goes on with the train.

The American Review of Reviews for December, 1906, page 712, has an elaborate article, by William Maver, jr., member of the American Institute of Electrical Engineers, on the electrification of the New York Central and the New York, New Haven and Hartford railroads, with illustrations of the electric locomotives, electric trains in England, etc.

In confirmation of the successful operation of the electric plan adopted by the New York Central, see the following (Associated Press dispatch, December 12, 1906):

"ELECTRIC TRAINS ON CENTRAL—MOTOR ENGINES NOW TAKE TRAINS AS FAR AS HIGHBRIDGE.

"New York, December 12.—The Yonkers commuter is giving thanks to-day for the installation of electric trains on the Hudson River division of the New York Central Railroad. At 12.11 yesterday noon the first train hauled by an electric motor car left the Grand Central station and was well loaded with passengers. The electric engine only carried the car as far as Highbridge. From Highbridge on to Yonkers a steam locomotive took its place. Thereafter all the Yonkers trains were operated by electricity.

"As soon as possible the electric service will be extended on the Hudson River division from Highbridge up to Yonkers. The trains on the Harlem division are also to be electrically operated in the course of time.

"Officials of the New York Central in charge of the electric division refuse to make any guess as to when the electrification will be completed on the Hudson River division or begun on the Harlem division. They will only say 'as soon as possible.'

"There was no announcement beforehand by the Central officials that the electric service would begin yesterday. No celebration of any kind marked the occasion.

"The temporary terminal which has been built under the Grand Central Palace at Forty-third street and Lexington avenue will be opened to-morrow morning for the dispatching and receiving of all trains running over the Harlem division. It is believed that this will do much to relieve the congestion at the Forty-second street station."

[The World's Work, January, 1907, p. 8446.]

NEW MOTORS ON RAILROADS.

By BERNARD MEIKLEJOHN.

This is a very interesting article, descriptive of the three kinds of motors for railroads, viz, electric locomotive, gasoline motor car, and the gasoline electric motor car, this latter using a gasoline engine to generate the electricity on the car. It also has many illustrations, among which are seven showing these several kinds of motors. In speaking of the New York Central and Hudson River Company's adoption of electric motors it states that "they are to run 24 miles out from the Grand Central station on the Harlem branch and 28 miles out from Mott Haven Junction on the Hudson division," and that "285 miles of track are being equipped with the third rail." In speaking of the electric locomotives it says that the company now has 35 of them in commission. It further says:

"The electric locomotives for a time will draw trains only between the Harlem River and the Grand Central station, but later will pick them up and drop them about 30 miles out. The locomotives themselves have been tested so many times that is is now clear what they can do. On a 6-mile stretch of experimental track at Schenectady they were racing with steam trains more than two years ago and beating them, for they are capable of a speed running up to 80 miles per hour. They have a capacity of 2,200 horsepower. Some interesting tests were made recently to discover whether they could get up speed as rapidly as a steam locomotive. In the run, in which conditions were similar to those which will prevail in actual work, the electric locomotive walked away from the puffing steam locomotive, and in 500 yards had secured a lead of a six-car train length. To show the advantage of the electric locomotive these facts were noted. The electric locomotive was 30 feet shorter than the steam locomotive, weighed 70 tons less, drew a load of 50 tons more, and reached a speed of 50 miles an hour a minute sooner, speeding along smoothly, and, of course, leaving no smoke. The steadiness of the electric locomotive has surprised everyone who has ridden on one, for it does not 'nose' the track as steam locomotives do, and they round curves with greater ease."

The CHAIRMAN. Is there any other gentlemen present who wishes to be heard in favor of this provision of the bill? Does Commissioner West desire to be heard?

Commissioner WEST. Mr. Macfarland has uttered the views of the District Commissioners very thoroughly, and I am heartily in accord with him on the subject.

Senator WHYTE. Mr. Chairman, may I make a suggestion?

The CHAIRMAN. Certainly.

Senator WHYTE. I have had something to do in Maryland in pursuing the Baltimore and Ohio Railroad in regard to the rights of the State of Maryland, in which we recovered about two and a half million dollars on the stock that the State held. I was one of the counsel appointed by the legislature. In doing so, it took me a good deal of time to examine all the arrangements here for the new Union Depot. I do not think there would be any difficulty about this matter if the roads had a little more time. For instance, we

have been anticipating the opening of the Union Station much earlier than it can possibly be opened. I doubt very much if it can be opened before August or September of this year. I think they ought to be able to get into that depot and make their arrangements there before being required to comply with a smoke regulation.

The CHAIRMAN. Under the law they have until February, 1908. I think I am correct. Am I not, Mr. Macfarland?

Commissioner MACFARLAND. Until January 1, 1908, is the provision in section 2 of this bill.

Senator WHYTE. I was going to suggest that if it was made the 1st of July, 1908, I do not think there could be any objection to it.

STATEMENT OF EVAN H. TUCKER, PRESIDENT OF THE NORTHEAST WASHINGTON CITIZENS' ASSOCIATION.

Mr. TUCKER. Mr. Chairman, one alteration that our association wishes to present is on page 2, line 21. We would like to have the word "sixty" changed to "one hundred," making the street on the east of the terminal 100 feet wide instead of 60. F street, which that street leads to, is 100 feet wide, and we anticipate that a throat would be formed there by making the entrance to it only 60 feet. Moreover, we believe that a street car line will occupy that street in going around into F street, and we think it should be at least 100 feet wide.

The association has approved the first section, with the exception I have stated, and it has approved the second section of the bill.

In regard to the smoke proposition, Mr. Macfarland has stated the views of the citizens, I think, very well. I represent the northeast section of the city, where the residents have been suffering for years from the smoke of the Baltimore and Ohio Railroad, and I anticipate a great deal more trouble when we have all the trains coming in over that viaduct. I understand that there will be about 30 tracks, side by side, and trains will be passing all the time.

I submit to you, gentlemen, and I believe it is correct, that there is more nuisance from the trains of the Baltimore and Ohio Railroad alone to-day than from all the business properties in the District of Columbia; and it does seem like a great discrimination against our business men to allow these railroads to come here and make a greater nuisance and go scot-free while the business men are kept to a strict enforcement of the law.

So, on behalf of the citizens of northeast Washington, I want to give my hearty approval to this measure. While we do not want to ask the railroads to do anything unreasonable or impracticable, I think our Commissioner has shown that it is practicable, and we certainly ask that they shall do whatever is practicable to relieve us of this great trouble.

Senator BURKETT. Your idea is that F street being 100 feet wide, this street should be of the same width?

Mr. TUCKER. Yes, sir; F street is 100 feet wide, and this street that leads into it is to be only 60 feet wide unless the bill is amended as I have suggested.

The CHAIRMAN. That particular point will be examined by the committee and determined upon. Is there any other gentleman present who desires to be heard in support of the bill?

STATEMENT OF R. P. ANDREWS, REPRESENTING THE BUSINESS MEN'S ASSOCIATION.

Mr. ANDREWS. Mr. Chairman——

The CHAIRMAN. You represent the Business Men's Association?

Mr. ANDREWS. Yes, sir.

The CHAIRMAN. Have you been delegated by that association to appear here?

Mr. ANDREWS. Yes, sir.

The CHAIRMAN. Proceed, Mr. Andrews.

Mr. ANDREWS. We only wish to elaborate one part of Commissioner Macfarland's remarks regarding the injustice of the present law upon the business men. Our business men are brought before the police court and fined for violations of the smoke law, when in fifteen minutes the engines of the Pennsylvania Railroad at Sixth street would make more smoke than the man who is convicted of violating the law would make in thirty days.

As an instance of it, one day last fall Colonel Staples, of the National Hotel, was fined for violating the smoke law. I do not remember the amount. The morning he was convicted I walked to Sixth street and Louisiana avenue, and the smoke from engines of the Pennsylvania Railroad standing on Sixth street almost obscured the National Hotel from view. Still the Pennsylvania Railroad was not fined.

All that the business men here want is fair treatment. We want to be on the same footing as the railroads, and we want the railroads to be on the same footing that we are.

It is the consensus of opinion of the Business Men's Association that if we had an emission of smoke of three minutes allowed in one hour it would meet our case, and it would let us out as far as——

The CHAIRMAN. All that has been thrashed over, Mr. Andrews. It is not worth while to take up the question of the smoke nuisance in a general way. Does any other gentleman present wish to be heard in advocacy of the proposed legislation? If not, we will hear the other side.

STATEMENT OF SAMUEL REA, THIRD VICE-PRESIDENT OF THE PENNSYLVANIA RAILROAD.

Mr. REA. Mr. Chairman and gentleman of the committee, on behalf of the Philadelphia, Baltimore and Washington Railroad Company, the Washington Terminal Railroad Company, and the Baltimore and Ohio Railroad Company we are present here before you in opposition to the bill H. R. 9329, and especially in opposition to section 2. In connection with the same measure Hon. Henry B. F. Macfarland, president of the Board of Commissioners of the District of Columbia, in November last, addressed the president of the Pennsylvania Railroad Company as follows:

"The Commissioners of the District of Columbia have the honor to request that, in order to obviate the objections to smoke-emitting locomotives, arrangements be made by your company to use only electric motors to draw its trains within the District of Columbia from the time the Union Station in the city of Washington begins to be used."

To which our late president, Mr. A. J. Cassatt, replied as follows:

"In reply to your favor of the 16th instant, conveying the request of the Commissioners of the District of Columbia that arrangements be made by the Philadelphia, Baltimore and Washington Railroad Company to use only electric motors to draw its trains within the District of Columbia from the time the Union Station begins to be used, I beg to say that we expect to open the station next spring or early next summer and it would be quite impossible to install an electrical plant by that time, even if it were reasonably practicable to do so at any time.

"The use of electric locomotives by the New York Central road for the movement of its passenger trains to and from its station in New York was necessitated by the impossibility of properly ventilating the tunnels forming the approach to the station. For the same reason the Pennsylvania Railroad Company will have to use electric power for the movement of its trains through its tunnels under the North and East rivers. One railroad entering Paris has resorted to the use of electric power for the same reason, but these are the only instances that I know of where electric power is used for this character of service. The use of electric motors at terminals is therefore only in the experimental stage, but it is very certain that the shifting and making up of trains can not be done as expeditiously by this method. The public would also be incommoded by the necessity of an extra stop to change from electric to steam locomotives at the border of the District, which would be seriously objectionable in view of the high-speed service which we propose to establish between Washington and the North. As the tracks leading to the Union Station, both from the north and the south, do not run through important residential sections of the city, we hope that the Commissioners will at least wait to see whether the use of steam locomotives burning semibituminous coal shall be seriously objectionable before proceeding further in this matter, and I hope that I may be allowed to add that we think the Commissioners and the public should give us credit for providing this magnificent station for the capital of the nation at a cost far greater than we would have been justified in incurring if we had dealt with the matter from a purely business standpoint, and that they will not seek to impose any further burdens than have already been voluntarily assumed for the credit of the country by the railroads concerned."

As a supplement to Mr. Cassatt's communication, I deem it necessary and appropriate to review the railroad situation in the District of Columbia leading up to the present plans for a Union Station. It will be recalled that the many grade crossings in the District were a great inconvenience, and their elimination was discussed for many years, resulting finally in authority being granted to both the Baltimore and Ohio Railroad Company and the Baltimore and Potomac Railroad Company (now the Philadelphia, Baltimore and Washington Railroad Company) to reconstruct their terminal stations substantially on their old sites, and reconstruct, revise, elevate, and depress their lines so as to get rid of all grade crossings within the District, and also to build a new Long Bridge.

Before the work was well advanced inquiries were made looking to a Union Station, and notwithstanding these railroad companies were fully authorized to carry out their plans independently, they did unite

in the movement for a broad treatment of the whole matter, which resulted in a separation of the freight and passenger lines through the District and the erection of a Union Station, which is now nearing completion and which is one of the largest and most costly railroad stations in the world, and architecturally in keeping with the many handsome buildings within the District.

There has been expended to December 1, 1906, for the construction of the new Union Terminal in the District of Columbia and its tracks and facilities the sum of nearly $15,000,000, and a further expenditure of $3,700,000 is necessary before this large undertaking can be considered complete. This does not include the expenditures for the new Long Bridge over the Potomac River or for the new Potomac yard south of it, so that probably over $20,000,000 has been expended for these improvements in Washington and vicinity within the last few years, and at least $5,000,000 more is necessary to fully complete the same.

Therefore by far the larger part of this work is now finished, and to install an electric system would mean to change the plan of working and throw away much of this new work, which it has taken years to construct, and rebuilding a great part thereof, and at an additional cost of about $5,000,000 more. The operation of the railroads under such conditions in the District of Columbia could not possibly earn sufficient to pay operating expenses and the fixed charges on the money invested, nor even on the present investment will such be possible for many years. It would also be very difficult, if not impossible, to borrow new money in addition to what has been already raised for the purpose not contemplated in the original acts nor included in any scheme for financing the work.

The railroads entering the District of Columbia from the South already feel that they will be heavily burdened to meet the charges that may be made for the use by them of the new passenger station, appurtenances, and yard facilities, and out of all proportion to the business now in hand or expected in the near future, and any increased cost would cause them to be so heavily taxed that the whole operation would be carried on at a serious loss.

The use of an electric system at terminals is in the experimental stage (the work in past years having been one of constant change and development, and there is now a radically new system before the electrical world, the single-phase system, which promises important advantages for work of the character required. This system is also in the development stage, and of course it would be extremely unwise to install such a system in an important center where reliability of operation is essential. For this reason a railroad company which is compelled at the present day to install an electric system must be prepared to later adopt radical improvements.

It is true that the Pennsylvania Railroad Company will within the next two years install an electric system in connection with the operation of its trains from New Jersey under the North River into the city of New York, and thence under the East River into Long Island City, and it is also true that the New York Central and Hudson River Railraod Company and the New York, New Haven and Hartford Railroad Company are making use of electric locomotives for the movement of passenger trains to and from their terminus in New York, and there is also a railroad in Paris which has re-

sorted to the use of electric power at its terminal, but all of this was made necessary by the impossibility of properly ventilating these long tunnels with such very frequent service and to do so safely. These are entirely different propositions from that existing in the District of Columbia. The lines and station in New York are in the residential section of the city, and the Grand Central Station is a stub station, requiring extensive train movement by steam locomotives to such an extent not required in the station in Washington. The latter is a stub and a through station, eligibly located naturally, well supplied with air, and the tunnel connecting the same with the South will be confined to passenger trains moving at infrequent periods, as compared with the service in the New York stations.

Another important factor which should not be overlooked is the fact that, if an electric system were adopted, it would seriously incommode the public, and the railroads, by reason of the extra stop the trains would have to make in order to change from steam to electric locomotives at the border of the District. This change would take from six to eight minutes, and for through trains, making a stop at the northern and southern boundary of the District, from twelve to sixteen minutes. The new station plans provide for a service of about 268 trains to arrive at and depart from the same daily, and averaging the loss at seven and one-half minutes per stop, or fifteen minutes per train, would make four thousand and twenty minutes for the 268 trains, or about 67 hours loss in every twenty-four hours for trains passing north and south, which would make it impossible to maintain the high-speed service proposed between Washington and the north, for which the line has been prepared at an expenditure of many millions of dollars during the past seven years.

The railroad companies have not been unmindful of their responsibility in this matter, and have constructed a large freight yard south of the District of Columbia, known as the "Potomac yard," for the purpose of keeping all freight locomotives out of the District, except those hauling trains through from the north and south as a part of active train movement, and for the important local requirements of the District, and you can readily understand that such action will be an important factor in removing any cause for complaint as to smoke.

We submit, therefore, that the railroads be given every opportunity to carry out their plans and use locomotives burning semibituminous coal, which will result in emitting very little smoke, certainly not enough to term it seriously objectionable, before being compelled to make further expenditures and thereby add to what is now the largest investment of the kind in the world when measured by the traffic requirements.

It should be borne in mind that the railroad companies are voluntarily providing a magnificent terminal for the capital of the nation, a small portion of the cost thereof to be contributed by the Government, far beyond the needs of a city of its size, which station will only be fully used at infrequent periods like the inauguration of the President, and at a cost far greater than they would have been justified in incurring if they had dealt with the matter from a purely business standpoint and with the view of providing for actual traffic needs. In the conception of their plans it must be admitted that the railroads have done their part in aiding the Government in beautifying the city, and to summarily impose additional burdens upon them

never contemplated in the original scheme would certainly be most unjust, particularly as the success of the project proposed would, as I have stated, if installed be somewhat problematical and not in accord with the spirit of the whole undertaking. The whole subject is foreign to the negotiations and the agreements and acts authorizing the work.

Our protest against the act is against the institution of an electrical system in lieu of steam locomotives, because this is the only method suggested whereby the operations may be conducted without the emission of smoke, and may be brieffy summarized as follows:

First. Loss to the public, the District of Columbia, and the railroad companies, occasioned by the delay of at least two years in the opening of the station and improvements.

Second. Delay to passengers and trains, made necessary to change from steam to electric power, both coming in and going out of the District.

Third. The greatly increased and unwarranted cost to the railroads of such a change, as arrangements are completed for steam service.

Fourth. While there are electric systems in operation for the movement of passenger traffic, no practical system of electric traction has yet been devised for the movement of such heavy freight traffic as that between the North and the South, which consists in large part of perishable commodities and supplies for the markets of the larger cities, and must be moved expeditiously.

Sixth. The establishment of a freight yard outside of the city limits by the railroad companies, so as to keep the city free from unnecessary train movement as well as smoke.

Seventh. The opportunity of testing the use by the railroad locomotives of a semibituminous coal, and thus materially reduce the smoke from railroad engines.

Eighth. That such station and yards will require an outlay by the railroad companies of about $25,000,000, and no additional burden should be imposed.

Ninth. That after such an outlay, and the character of architecture the railroads have adopted, they, as well as the District authorities, are interested in their beauty and preservation, and may be relied upon to take all practical steps to abolish anything that would impair the same. They should be given a reasonable period after the opening of the station to accurately ascertain the results of operation and to test different grades of fuel before being compelled to abandon in large part the present outfit for steam operation and install electricity. Any other course would be shortsighted and unbusinesslike on the part of the Government and the railroads.

The CHAIRMAN. Mr. Rea, did I understand you to say that the plan is to open this station in the spring or early in the summer?

Mr. REA. Yes, sir.

The CHAIRMAN. Next summer?

Mr. REA. To open a part of it. We hope to do so.

The CHAIRMAN. That is several months ahead of the time required by law. Let me ask you if you have made any estimate as to the approximate cost of electrifying the line from Baltimore to Washington and from Alexandria to Washington?

Mr. REA. No, sir; we have not.

The CHAIRMAN. I notice in the World's Work for January of this year an article by Mr. Bernard Meiklejohn—I do not know who he is—and in speaking of the electrification of railroads in New York he writes as follows:

"Two hundred and eighty-five miles of track are being equipped with the third rail. An entirely new system of electrical signals is being installed. An army of men has been at work for more than three years remodeling the right of way and preparing the new Grand Central Station to receive the trains of both the Central and the New Haven. A huge excavation was dug covering an area of 39 acres, on which 25 miles of track will be laid on two levels below the street, one level for express trains and one for locals. A new station has been built at Mott Haven Junction which will connect with two subway systems. Altogether there will be six new passenger stations in the electrical zone already equipped, and there will be 23 new ones within the range of the suburban electric-motor cars when the work is completed. The third rail is protected, and Mr. Wilgus"——

I think he is vice-president of one of the roads.

Mr. REA. Of the New York Central.

The CHAIRMAN (reading): "And Mr. Wilgus believes it will not be any more dangerous than any other form of electric installation. The whole huge remodeling of railroad and terminal will cost $70,000,000."

You have made no estimate as to the cost of electrifying the roads into Washington, Mr. Rea?

Mr. REA. No, sir; we have not considered the electrification of any of our long-distance lines. The line referred to by the Commissioner to Atlantic City we regard as a local line. That is run on the multiple unit system, with motors on each car. It is intended largely for local business, and in addition the service was extended to Atlantic City.

The CHAIRMAN. Does it carry freight?

Mr. REA. Half of the line is devoted to passengers exclusively. There is no freight hauled by electricity, and is not intended to be. It is purely an electric railroad.

The CHAIRMAN. Mr. Rea, you speak of semibituminous coal. Is it not practicable that these roads (provided it is not determined that they shall be made electric roads so far as getting to the Union Station is concerned) shall use anthracite coal?

Mr. REA. I think they could, unless it was proposed that all the railroads should use it; of course there would not be sufficient anthracite coal for that purpose.

The CHAIRMAN. But you could use it from Baltimore? For instance, you could change your locomotives there and at Alexandria, could you not, and have anthracite in place of bituminous coal at those points? Is not that feasible?

Mr. REA. Yes. It does not steam so well, you know.

The CHAIRMAN. But it is a short distance, and you would not lose many minutes.

Mr. REA. We think a good grade of bituminous or semibituminous coal would answer the purpose better than anthracite.

The CHAIRMAN. Just one more question, Mr. Rea. What about smoke consumers? Do you use them on any of your locomotives?

Mr. REA. Mr. Gibbs can answer that question. How is that, Mr. Gibbs?

Mr. GIBBS. They use them experimentally in Pittsburg and some in Cleveland.

The CHAIRMAN. How are they working?

Mr. GIBBS. Not very satisfactorily.

The CHAIRMAN. Not satisfactorily?

Mr. GIBBS. No, sir.

The CHAIRMAN. Do they reduce the smoke to some extent?

Mr. GIBBS. They whitewash the smoke, but they do not eliminate it.

Senator SCOTT. I want to ask Mr. Rea how about the use of coke?

Mr. REA. Coke, as I understand it, Senator, does not make steam rapidly enough for the heavy trains and the high-speed trains.

Senator SCOTT. Is it not a fact that the Baltimore and Ohio are now experimenting with coke on some of their engines?

Mr. REA. They have experimented for years.

Senator SCOTT. I mean that they are operating them here in the District?

Mr. REA. I do not know. Mr. Gibbs can, perhaps, answer the question as to the use of coke.

Mr. POTTER. Mr. Chairman——

Mr. REA. Mr. Potter, perhaps, will answer it.

Mr. POTTER. We have no such experiments under way now. We are using coke in Pittsburg over the Junction road in compliance with the ordinance, only for a short distance. That necessitates our stopping the trains before reaching the Junction road and taking on the coke, which causes a delay of from five to ten minutes for each train.

The CHAIRMAN. Mr. Rea, proceed.

Mr. REA. Excuse me, Senator Scott. I would say our shifting engines within the District here use coke for the purpose of reducing the smoke.

The CHAIRMAN. What is the length of the subway here?

Mr. REA. The tunnel?

The CHAIRMAN. Yes, sir; the tunnel.

Mr. REA. I think about 4,000 feet, and you understand that the service through those tunnels, because there are two separate tunnels, will be very infrequent as compared with the railroads and terminals mentioned at New York. With the present service there would not be an average of trains oftener than every forty-five minutes in the twenty-four hours through these tunnels, whereas in New York we have to figure for a capacity ultimately of trains every two and a half or three minutes.

The CHAIRMAN. Is there any method of better ventilation for this tunnel than they had for the old tunnel in New York?

Mr. REA. There is no artificial ventilation in the old tunnel, but here provision has been made for ventilation in this tunnel if it is necessary. I do not know that it will be necessary. The tracks being in separate compartments and the end of each having a tunnel to itself, it will probably ventilate itself, with such infrequent service as there will be through it.

Senator SCOTT. If this bill were amended so as to allow the use of coke, the expense of the change and the delay to the railroads would not be great, would it?

Mr. REA. Yes, sir; you would either have to change and take on new engines or take on coke at both ends. You see that ultimately we look forward to a four-hours service from Washington to New York; that is probably an hour better than the best trains running to-day; and to do that you can make no additional stops. Besides, it is very inconvenient stopping just outside of a station and changing. Aside from all that there is the enormous expense that is involved in making this change. I say it is unjust on the company, when all of its plans in fact were predicated on the use of steam, to come in at this late day and ask us now to change it all and throw away and rebuild. We can hardly think it is fair under the circumstances.

Senator SCOTT. Do you not think it would be better to have the bill amended so that you could use coke? Then you would not have to throw away and abandon anything.

Senator BURKETT. Mr. Rea, did I understand you to say that it would delay the opening of the depot and the tunnel two years?

Mr. REA. Oh, at least. We would have to go to all of this additional expense, which would probably be upwards of $5,000,000. As you see, all the facilities for steam railroad operation would have to be changed.

Senator BURKETT. I noticed that in your remarks you said something about requiring this to be done before a full investigation as to the merits of the different systems of electrification could be considered. Is there any time which you would be willing to have set?

Mr. REA. No, sir; I would not.

Senator BURKETT. When you would be willing to electrify these roads?

Mr. REA. The changes in electrical development are, you might say, almost daily.

Senator BURKETT. That is so with everything. Then we could not do anything because there might be a change. Is there not a time when you would be willing to take the development at that time and electrify the roads?

Mr. REA. I should think not. I do not think the matter should be imposed on the company. Congress always has the right to take it up in the future. It does seem to me that the company should be permitted to carry out the plans as prepared and upon which the exepnditure was made and the financing done and that you should give them a trial at least.

Senator BURKETT. I only asked the question, you will understand, in connection with your suggestion that the state of development was such just at present that you did not like to have to accept the present system of electrification because a better one might come out or was just coming out.

Mr. REA. No. I would say very frankly we never looked forward to having to use electricity through the District, while we expected and still expect that if the nuisance from smoke can be mitigated in other ways, as by excluding from within the District all shifting and yarding that was not absolutely necessary for the local business of the District, we could control the through movement.

The CHAIRMAN. Has any other member of the committee any questions to ask?

Senator HANSBROUGH. Mr. Rea, I should like to ask you a question. I understood you to say that the electrification of your system in the District here would be very inconvenient with respect to the movement of freight trains. Did I understand you correctly?

Mr. REA. Yes, sir.

Senator HANSBROUGH. I recall reading a few days ago a newspaper item in regard to the Great Northern road, Mr. Hill's system, which has a tunnel about 3 miles in length through the Cascade Mountains, to the effect that he proposes to electrify his system through that tunnel, and to attach the electric engine immediately in front of the steam engine, allowing the fire to go down, of course, ceasing to fire up before they reach the tunnel, and putting on the electric engine and taking the whole train through. Would that be feasible here?

Mr. REA. I do not think that would be adapted for the District. I know the tunnel you speak of, the Cascade tunnel, has given them more or less trouble from smoke, some of the employees having been asphyxiated. While I know nothing of the Great Northern's plans I can see how electricity might be adapted there to great advantage. The Cascade Mountain is at the summit of a heavy grade in both directions. There is good water power on both sides of the Cascade Mountain for the development of electricity, and it always seemed to me an ideal place, if the electricity could be developed cheaply enough, to put on a huge motor there which would act as a helping engine over the mountains. Therefore it may be that that would be the cheapest method of helping trains over that grade.

Senator HANSBROUGH. I do not understand you to complain of the cost of electricity here.

Mr. REA. Oh, that is one of our chief complaints, because it is an expenditure on the top of all the expenditures that have been made, and all that are necessary to conduct the operation under steam.

Senator HANSBROUGH. There is a heavy grade through that tunnel. I think it is a tunnel 13,000 feet long, and there is a grade of 250 feet.

Mr. REA. Yes; but you will understand that in lieu of using one or two large additional engines to help the train over this grade and through the tunnel, if they could develop electricity cheap enough it might be the very best plan of operation to install electricity there with a large electric motor to help the trains over the grade, and do it more cheaply than with steam.

Senator HANSBROUGH. You are not so very far away here from the Great Falls of the Potomac. Why not put in an electric plant there?

Mr. REA. We have no such grades to overcome. The road engines start, you know, and usually run anywhere from 100 to 150 miles. That is the run. You have to look out for economies in operation.

Senator SCOTT. Do not the Baltimore and Ohio, under the city of Baltimore, attach an electric motor ahead of the engine and pull the engine and the whole train through?

Mr. REA. Yes; I believe they do.

Commissioner MACFARLAND. May I submit that among the papers I put in here there was one read before the New York Railroad Club,

by J. E. Muhifeld, general superintendent of the motive power of the Baltimore and Ohio Railroad, entitled "Large electric and steam locomotives," in which he states that "the electric locomotive slips in from a side track and hitches onto the steam locomotive, which latter then ceases to work, the electric locomotive hauling it and the train through, when it is disconnected, and running on ahead it runs off on a side track, while the steam locomotive resumes operations and goes on with the train."

That is the service in Baltimore, and that service has been going on for ten years.

May I invite attention to the fact that this bill does not provide for the electrification of these railroads, but it simply applies to them the "smoke law," which can be best met by electrification, but which might be met by the use of anthracite or coke, as Senator Gallinger and Senator Scott have suggested, or by the use of smoke consumers.

The CHAIRMAN. Does any other gentleman present desire to be heard?

STATEMENT OF HUGH L. BOND, JR., SECOND VICE-PRESIDENT OF THE BALTIMORE AND OHIO RAILROAD, AND VICE-PRESIDENT OF THE WASHINGTON TERMINAL COMPANY.

Mr. BOND. Mr. Chairman, I wish to call the attention of the committee to the way in which this matter comes up, because it has a practical bearing on the action of the committee if not on the general subject.

This bill for using additional property on the east side of the terminal area, as defined in the act of February 28, 1903, is a bill to carry out a plan that was suggested primarily by the fact that east of the station, as provided for in the original act, there was a small tract of land with some inferior houses on the slope of ground. The slope being down toward the wall of the terminal and the streets being cut off by the terminal, you had a lot of inferior houses on stub streets that were impracticable in every way, and that could not be really properly drained. It seemed to everyone who looked at the conditions that the future of that ground would be its use for all sorts of nuisances in the way of petty saloons, etc., that it would be unsightly in every way, and there would be an unsightly lot of tumble-down buildings against this fine terminal structure. That was the origin of these plans. The original plans did provide for mail and express, of course, but the Post-Office Department wanted additional facilities for their mail. They wanted to put a branch post-office down there connected with the tracks. I understand that they wish to do that to-day, and they are interested in having this facility.

Now, for the sake of getting rid of this unsightly place and to furnish additional facilities for the handling of mail and express and milk the companies decided that they would go to the additional expense of acquiring this ground and of improving it with tracks. They agreed with the District Commissioners as to how that should be done, as to what street spaces should be provided, and as to the width of those streets. It was agreed by the Commissioners and approved by the Commissioners that a 60-foot street was plenty to connect with F street. So this plan originated not in any private

interests of the road, but in the same spirit which governed this whole improvement—a spirit of providing ample facilities for the Government, and providing them in a way that would be sightly.

We are not interested in the passage of this bill, except to that extent that we are willing to do this work if we get the authority. We do not care whether we do it or not. We can get along without it. We have plenty of facilities to do the present business as it is.

Senator HANSBROUGH. You are in favor of section 1 of the bill?

Mr. BOND. We are in favor of it. We have agreed to it, and we have agreed with the Commissioners to acquire the land and to dedicate the necessary part of it for the streets. That we have agreed to dedicate.

Senator SCOTT. You do not want to have the street widened?

Mr. BOND. We have agreed that 60 feet is enough. It will disturb all the plans for the improvements if we increase the width; that is, the plans will have to be remodeled. Now, that is as to this bill.

This structure by the Washington Terminal Company is undertaken under the authority of two acts of Congress. The first was the act of February 12, 1901, which provided for the incorporation of the Terminal Company under the general law of Congress providing for the incorporation of railroad companies in the District of Columbia. Certain sections were specified. The incorporation under that act was an incorporation in the interest of the Baltimore and Ohio Railroad Company alone.

When the Union Station project was adopted by the act of February 28, 1903, that act provided that the Terminal Company should do the work in the interests of both the Baltimore and Ohio and the Baltimore and Potomac, or the Philadelphia, Baltimore and Washington roads, practically in the interest of all other companies authorized to come into the District by Congress, who were to pay their pro rata for the use, and it provided that the Baltimore and Ohio should turn over one-half of the stock of the Terminal Company to the Philadelphia, Baltimore and Washington, and that then the work should go on as a joint work.

But the charter powers of the Washington Terminal Company are prescribed by the act of 1901 by a reference to the general law of the District and by the act of 1903, and those charter powers are to build and operate certain structures, with the approval of the Commissioners of the District of Columbia as to the plans and as to the locations. All through both those acts it is perfectly clear that those structures are to be structures for a steam railroad. The charter of the Washington Terminal Company, the eighth subsection of section 643 of the sections of the Revised Statutes relating to the District of Columbia, which is made a part of the charter by the act of 1901, confers this power on the Washington Terminal Company:

"To take, transport, carry, and convey passengers and property on its railroad by the force or power of steam, of animals, or any mechanical power, or by any combination thereof, and to receive compensation therefor."

Senator HANSBROUGH. Congress has reserved the right to alter, amend, or repeal that act.

Mr. BOND. Yes, sir; I will call your attention to that. By section 676 of the Revised Statutes Congress makes this reservation:

"Congress may at any time alter, amend, or repeal this chapter, saving and reserving all rights which may become vested under the same."

I say as a proposition of law that this company, having constructed its works on the location and on the plans authorized by these acts and approved by the authorities whose approval is required by those acts, and having spent millions of dollars for the application of steam power in the operation of those works, Congress could not by an act say, "You shall not use steam in the operation of these works, but that you shall use electricity." I say Congress could not make any such provision unless it provided compensation for the damage.

Senator BURKETT. The bill does not say that, does it?

Mr. BOND. I was coming to that. This bill nominally says, not that we shall give up the use of steam and use electricity, but it says that the law which was framed to regulate the use of stationary steam boilers shall apply to the use of a locomotive boiler. Our information from our operating and mechanical experts is that it is impossible to comply with that law. The process of combustion is the process of combining oxygen with carbon. In a stationary boiler you can provide any amount of grate space that you choose, and you can provide any amount of natural draft that you choose. In a locomotive your grate space is limited; your natural draft is limited; you must use a forced draft, and there is no fuel of any coal or coke that can be used with a locomotive under a forced draft that will not throw cinders at times.

Senator SCOTT. How about crude oil as used by the Santa Fe and Southern Pacific?

Mr. BOND. That is something with which I am not at all familiar, Senator. I do not know whether crude oil or denatured alcohol would throw sufficient steam, but I do not think a supply of it is available for the operation of railroads under reasonable circumstances.

The bearing of that on this question is this: I do not want to get into a discussion of the powers of Congress to regulate railroads in the District of Columbia. We say that it is unreasonable, after the expenditures these railroads have made. In addition to the expenditures that Mr. Rea has called your attention to, the Baltimore and Ohio has had to abandon its old freight terminals and build new freight terminals at an expenditure of about $2,000,000, so after the expenditures that these railroads have made it is not fair and just to punish them by inflicting unnecessary cost in the operation of their roads.

Now, this proposed law applies not only to this new terminal, not to the residence part of the District of Columbia, but it applies to every part of the District of Columbia. It will apply to our little jerk-water line, the old Washington City and Point Lookout, that runs down to Shepherd's, where we never have a full train, I think, but run two locomotives and some cars each way a day perhaps to accommodate some industries. It would apply to every track in the District of Columbia.

I say if you are simply going reasonably to regulate the smoke nuisance you can not adopt the regulations that you apply to a sta-

tionary boiler and apply them to the operations of a railroad in the District of Columbia. You have got to draft a new original regulation for the smoke nuisance. As it applies to the particular amendment of the law as prepared in this bill, the Washington Terminal Company could not accept the bill if it were passed in the form that it passed the House. It could not surrender its charter rights to use steam by accepting the bill with its smoke provision on it. So the passage of the bill in its present form simply means that these additional facilities for the Post-Office Department can not be furnished. If Congress sees fit to pass a separate act for the regulation of the railroads, that would be a different proposition, because we would then be free to test the reasonableness and the validity of the act, but with an amendment on an enabling act, if we accepted that enabling act and did the work, we would be estopped from questioning the reasonableness of the regulation.

Our advice is, from our operating and mechanical people, that the regulation is absolutely unreasonable and incapable of being complied with except by the abandonment of steam, and for the reasons explained by Mr. Rea we can not afford at this time to abandon the use of steam.

The CHAIRMAN. Mr. Bond, suppose that section was stricken out and a section substituted requiring the railroads to use anthracite coal or coke, what then?

Mr. BOND. I think, Senator, that ought to be confined to the locomotives that are constantly in use in the District of Columbia; I mean shifting locomotives and locomotives of that kind. I think if you make an absolute and arbitrary rule that nothing but anthracite shall be used in any locomotives entering the District of Columbia, you would impose a great and unnecessary hardship as to the road engines, and you would necessitate the stopping certainly of all the southern trains on the Virginia side of the river for a length of time sufficient to supply the tenders with anthracite. They could not afford to use anthracite either to Richmond or to Lynchburg or wherever they changed locomotives.

The CHAIRMAN. Could they not change at Alexandria?

Mr. BOND. Under those circumstances they would not attempt to change the locomotives there, I think, because there is no way of accommodating the locomotive when you take it off at Alexandria. Accommodation for all the locomotives has been provided out here in Eckington in the enormous tract of hundreds of acres that has been acquired in Eckington; and if the locomotive was taken off at Alexandria it would mean that additional provision would have to be made for it there. But the way that is done and the way we do in Pittsburg with the Junction road is not to pull out the fire built of bituminous coal that is then in the locomotive, but to put coke on the locomotive, which is thrown on the fire that is then in it.

The CHAIRMAN. Would not that be feasible in Alexandria?

Mr. BOND. I understand that that would necessitate a delay.

The CHAIRMAN. Of a few minutes.

Mr. BOND. It may or may not accomplish the result. I do not know about that. I am not an expert on that subject.

Senator BURKETT. Is this proposition any worse than the proposition in New York and Baltimore, where they have these provisions and requirements?

Mr. BOND. Yes, Senator.

Senator BURKETT. Why is the proposition worse here than it is in Baltimore, where you have been doing it for ten years, it is said?

Mr. BOND. In Baltimore we do not operate in yards, or shift locomotives, or anything else with electricity. We simply have a long tunnel there with a very heavy grade in it, whereas this tunnel is only a three-tenths grade. We have a heavy grade in the tunnel. Then we have an enormous grade right beyond the tunnel. All that is done in Baltimore is to put an electric helper on the front of the train.

Senator BURKETT. To pull it through?

Mr. BOND. To pull it through.

Senator BURKETT. And over in New York that was done by legislation, was it not?

Mr. BOND. But the difference in the situation is enormous when you take the requirements of this amendment.

Senator BURKETT. What I am trying to get at is, did you oppose the legislation in New York?

Mr. BOND. We were not in New York.

Senator BURKETT. Did they oppose it?

Mr. BOND. I do not know. But there the movements through the tunnel, as Mr. Rea has stated, were approximately every three minutes.

Senator BURKETT. There is such a habit every time anything is undertaken to be done to come up and fight it as if the whole railroad system and the whole railroad proposition was in jeopardy that really sometimes we are at a loss to know just when a measure is good and when it is bad from that standpoint. What I am trying to get at is did you fight it over there just the same as you are fighting it here?

Mr. BOND. In New York?

Senator BURKETT. Yes.

Mr. BOND. I do not know. The Baltimore and Ohio had no interest there whatever.

Commissioner MACFARLAND. May I answer the question from an article by Mr. Wilgus, vice-president of the New York Central and Hudson River Railroad, which appears in Harpers' Weekly, December 3, 1904? After describing the plan for the electrification of the New York zone of the New York Central and Hudson River Railroad, he says:

"As a result of this thorough investigation of the entire subject, the company finally in 1902 decided to proceed with the change of motive power, and in the following year the State and municipal authorities gave their sanction."

There that railroad seems to have suggested it.

The CHAIRMAN. It is almost 12 o'clock, the hour at which the Senate convenes. The Chair will take the liberty of inquiring if there are other gentlemen present who desire to be heard, with a view of having another meeting if necessary?

Mr. WILLIAM A. DONCH. Mr. Chairman, I am a property holder in the northeast, and I wish to state, for the benefit of the committee, that even now, when the engines are shifting material where the Union Station is located, and there is a strong west wind, I can smell the gas in my parlor very plainly.

The CHAIRMAN. Is there any other gentleman who desires to be heard?

Mr. BOND. Mr. Gibbs calls my attention to a matter which may answer Senator Scott's inquiry, and that is, if you start out to burn anthracite coal you must burn it throughout the run, because the arrangement of the grate and fire box and everything is different; but that the United States Geological Survey, in cooperation with the Pennsylvania Railroad, and, I believe, other railroads, are experimenting with low volatile coals, briquetting them, and it is hoped in that way we will get a fuel that will be superior and not so expensive as anthracite coal and that will emit very little smoke. Those experiments are in progress now.

Senator DILLINGHAM. I do not understand from anything you have said that you deem it impossible to comply with this law, but you place your opposition to it upon the unreasonable demand that is made upon the company?

Mr. BOND. That is it, sir; that the only way we can comply with it is to throw over steam altogether within the District.

Commissioner MACFARLAND. Mr. Chairman, may I just remind the committee, apropos of what has been said about the large expense of the terminal work to the railroads, that the National Government and the District government have contributed directly $3,000,000, and that a large amount will also be contributed in the form of damages and in the improvement of the plaza? I am sure that the Commissioners of the District fully appreciate all that the railroads have done here. I stated that in the beginning; and that makes it all the more remarkable to us that there should be any opposition to a provision so reasonable as that locomotive engines shall conform to the smoke law applied to all other engines in the District of Columbia. The requirement of the law can be met, as has been stated, in several ways, but best of all, of course, by electrification.

The CHAIRMAN. At a subsequent meeting of the committee this matter will be taken up for further consideration.

The hearing was thereupon closed.

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